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# Reducing Emissions Can Boost Profits

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WASHINGTON–The Natural Gas STAR Program is a flexible, voluntary partnership between the Environmental Protection Agency and the oil and gas industry that is designed to cost effectively reduce methane emissions from oil and natural gas operations.

Through this program, EPA works collaboratively with partner companies in all major gas industry sectors (production, processing, transmission and distribution) to identify and promote cost effective technologies and practices to reduce methane emissions. Gas STAR partners share information on cost effective emission reduction technologies and practices.

By working together to prevent gas losses, EPA and the oil and gas industry are improving the environment and profitability. Since 1990, Natural Gas STAR partners have captured more than 460 billion cubic feet of methane that otherwise would have been emitted to the atmosphere (Figure 1).

Natural gas operations are one of the largest man-made sources of methane, a greenhouse gas that is 23 times more potent than carbon dioxide. As the primary component of natural gas, methane also is a valuable clean energy source. Therefore, reducing emissions recovers an otherwise wasted resource, improves partner companies' bottom lines, and mitigates the environmental impacts of emitting a potent greenhouse gas.

In addition to increasing profitability, implementing methane-saving projects in oil and gas operations benefits industry in a number of ways and has broader societal impacts, including:

- Increased throughput and domestic natural gas supply as well as increased profits through selling the recovered methane;
- Lower operational, maintenance, fuel, and capital replacement costs as well as improved safety through installing state-of-the-art equipment;
- Reduced shareholder concerns and enhanced corporate reputation for risk management related to climate change; and
- Improvements in local air quality and less methane lost to the atmosphere.

The benefits to companies from participating in this voluntary program are evidenced by the large partner base and

**FIGURE 1**

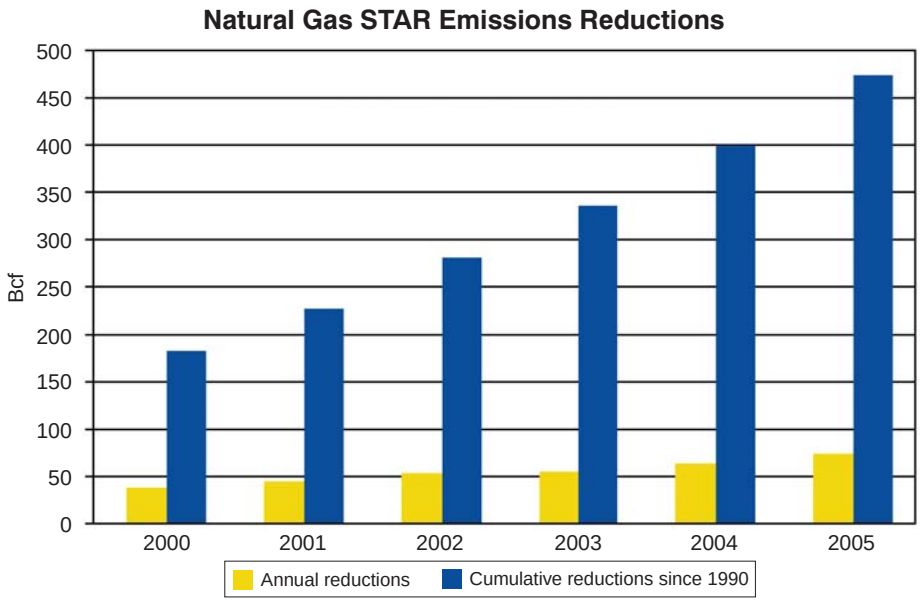



**FIGURE 2**

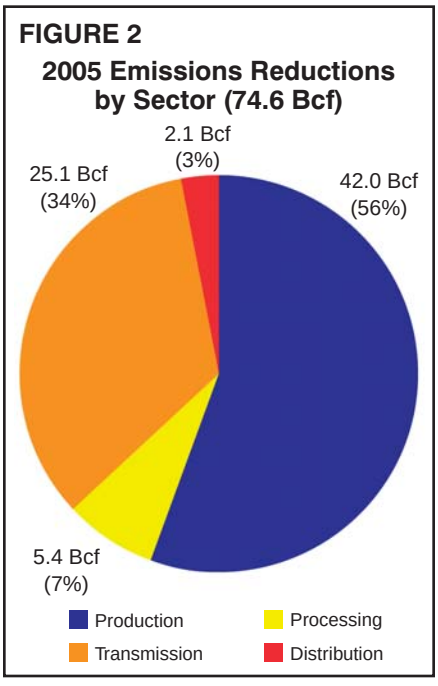
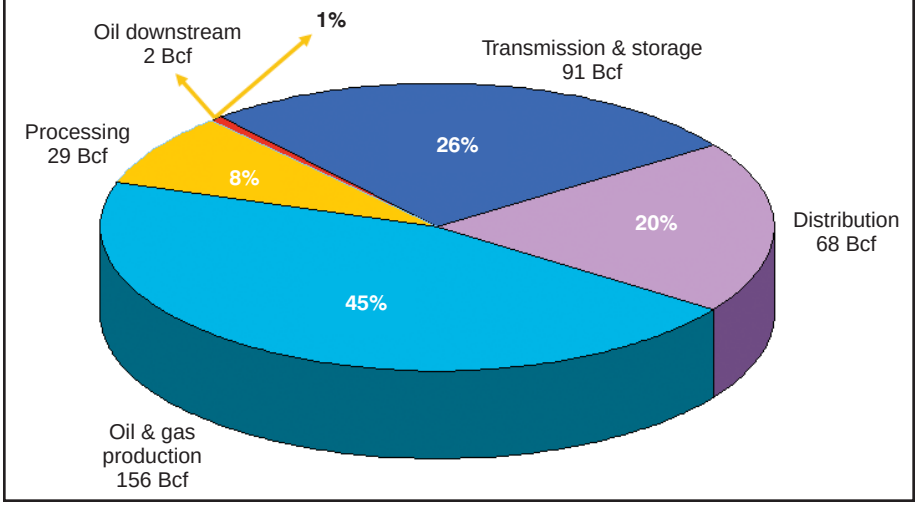


**FIGURE 3**




continued growth of the program since its inception in 1993. Now in its 14th year, there are more than 110 partners in the Natural Gas STAR Program, representing 56 percent of the natural gas industry in the United States, including 19 of the top 20 gas-producing companies.

In addition, Natural Gas STAR is endorsed by 19 trade associations such as the American Exploration & Production Council (formerly Domestic Petroleum Council), Colorado Oil & Gas Association, Independent Petroleum Association of America, Independent Petroleum Association of Mountain States, Petroleum Association of Wyoming, and the Texas Alliance of Energy Producers.

AXPC President William Whitsitt states, "We are pleased and proud that many of our member companies are part of the Natural Gas STAR Program. Participating in the program makes sound business sense, and the data have clearly shown positive results in reducing greenhouse gas emissions, demonstrating that voluntary, cooperative programs are an effective tool to simultaneously meet environmental goals and increase profits."

### Accomplishments To Date

Since the program began, Natural Gas STAR partner companies have achieved significant successes in terms of reducing methane emissions, improving operational efficiencies, and increasing profitability by selling recovered methane. For calendar 2005, Gas STAR partners reported emission reductions of 74.6 Bcf, making it a record year for the program. The production sector is responsible for 56 percent (42.0 Bcf) of the 2005 emission reductions (Figure 2).

The 2005 voluntary emission reductions of 75 Bcf equate to additional revenue of more than $560 million, assuming a 2005 average natural gas price of $7.51 an Mcf. In addition, these results have a climate impact equivalent to removing 5.5 million cars from the road for one year or the carbon sequestered by 8.2 million acres of forest in one year.

While the program has achieved significant successes in reducing methane emissions and increasing profits, there still is a great deal of opportunity to further reduce methane emissions further. The EPA's *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2005* estimates that natural gas operations account for 346 Bcf of methane emissions a year, which amounts to $2.42 billion in lost revenue (at $7.00 an Mcf natural gas price). The production sector represents 45 percent of estimated methane emissions from natural gas operations (Figure 3).

### Options For Producers

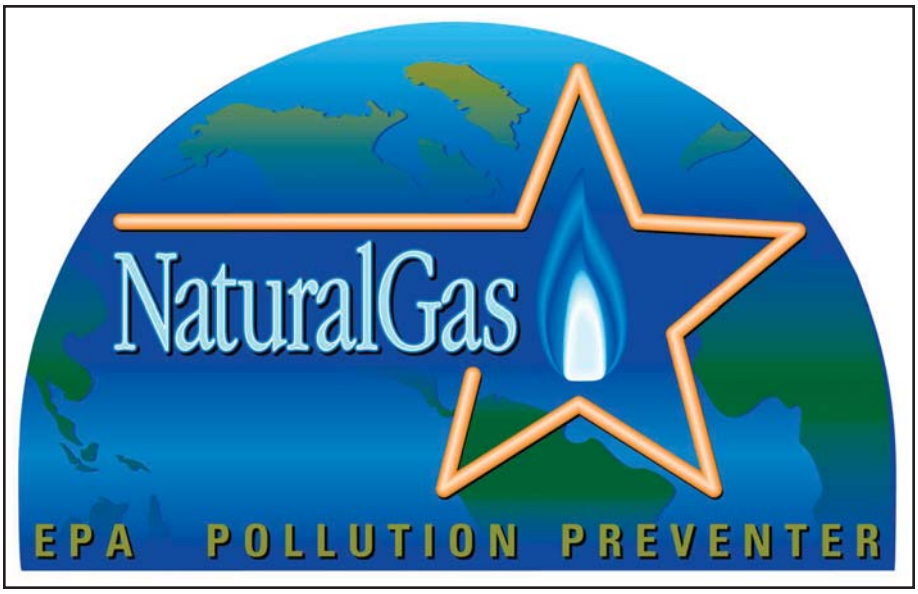
Devon Energy Corp. joined the Natural Gas STAR Program in July 2003 and has been a very active partner, reporting emission reductions of close to 20.0 Bcf since 2003 and 23.6 Bcf since 1990 by implementing a range of cost-effective emission reduction technologies and practices.

Devon attributes a majority of these reductions (15.9 Bcf since 1990) to its reduced emissions completions (RECs) practice. Devon identified RECs as a major income generating opportunity in its Fort Worth Basin operations by substantially reducing venting during cleanup procedures after fracturing wells. Devon has reported a $22 million increase in net gas-sale value in the Fort Worth Basin since implementing this Gas STAR recommended practice in 2004.

More detailed information on Devon's RECs practice is available at http://www.-epa.gov/gasstar/worshops/collegestation-may2007/7-completions.pdf.

Options for reducing methane emissions from small- to midsize natural gas production companies range from cost effective methods to find, measure and fix fugitive emissions to installing new technologies that frequently pay back investments in less than a year.

Natural Gas STAR partner companies have implemented these options when the wellhead price of natural gas was between $1.75 and $3.00 an Mcf. With a higher price for natural gas, these practices and technologies are even more attractive. High natural gas prices are motivating companies to seek even more



new technologies and practices to reduce natural gas emissions.

Each type of gas production has unique technology and operational requirements, with different opportunities for gas savings. The Gas STAR Program takes into account company-specific operating environments, corporate goals and resources to assist partners in identifying the "right" technologies and practices to cost effectively reduce methane emissions.

**Reducing Emissions**

For example, some partners have substantially reduced methane emitted during the well completion process by implementing reduced-emissions, or "green" completions. The common practice in completing a gas well following drilling or workover is to flare the initial produced gas to scour the producing zone of drilling fluids, sand and water. An alternative is to bring portable equipment to the well site that cleans most of the initial produced gas to pipeline sales standards.

The additional equipment may include portable sand traps, separators, and a dehydrator if the permanent installation is not completed or is out of service for maintenance. In addition to reducing methane emissions, this Gas STAR recommended practice produces an immediate revenue stream from the produced natural gas and gas liquids, less solid waste and water pollution, and a safer operating practice.

More detailed information on green completions is available at http://www.epa.gov/gasstar/pdf/pro_pdfs_eng/greencompletions.pdf.

Another exciting opportunity is to use remote-sensing leak detection technologies such as an infrared camera that can detect or "see" natural gas leaks and emissions in real time. Some partners have mounted the camera on a helicopter for aerial imaging (e.g., identifying the exact location of leaks in gas-gathering pipelines or compressor stations, etc.), while others have operated hand-held cameras at ground facilities.

As an example, one Natural Gas STAR partner company discovered that it was receiving only half the gas metered into its gathering system! That company now is using aerial optical leak imaging to find those leaks. Small and midsize producers may find it is more economical to contract services of vendors that use the cameras, rather than purchase their own.

More detailed information on these and other cost effective options for reducing methane emissions from small- to midsize natural gas production facilities can be found in "Cost Effective Methane Emission Reductions for Small and Midsize Natural Gas Producers," written by R. Fernandez, R. Petrusak, D. Robinson and D. Zavadil and published in the June 2005 issue of *Journal of Petroleum Technology*. In addition, all Gas STAR technical documents on recommended technologies and practices are available at http://www.epa.gov/gasstar/techprac.htm.

**How Gas STAR Works**

There are numerous reasons companies join the Natural Gas STAR Program:

- A company can save time identifying the "right" technologies and practices for its operating environment to cost effectively reduce methane emissions through one-on-one assistance, detailed technical documents and information.
- Companies build networks with industry peers and draw on their experience and success through the program's technology transfer workshop series.
- Minimal resources are required to administer the program. Standardized forms and default emission values, data collection software as well as online record keeping and reporting, and technical support staff are available.
- Participants enhance their corporate reputations through public recognition and easy methods to quantify environmental benefits.
- The program provides the capability to record and benchmark voluntary reductions. (Gas STAR production partners will get credit for emission reduction actions back to 1990.)

To help partner companies get the most out of participating in the program, EPA provides technical, programmatic, and outreach/marketing support and assistance. Specifically, EPA assists companies in analyzing emerging technologies and practices, develops workshops and training courses on relevant topics, and develops tools and materials to clearly communicate information across the industry.

EPA offers one-on-one methane project identification and implementation assistance as well. To promote technology transfer and share industry best practices, Gas STAR partner companies share information on cost effective technologies and practices they have implemented. With company permission, the program shares these successes publicly through a variety of mediums, including:

- "Lessons learned" studies;
- PRO (partner-reported opportunity) fact sheets;
- *Gas STAR* quarterly newsletter; and
- Technology transfer workshops.

**SUZIE WALTZER** *joined the Environmental Protection Agency's Climate Change Division in January 2007 to work as a program manager with the Natural Gas STAR Program. She promotes cost effective operational efficiency improvements and technologies to reduce methane emissions from oil and natural gas operations. Prior to joining Gas STAR, Waltzer worked with the EPA's Clean Air Markets Division, managing its air quality and ecological assessments to evaluate the effectiveness of regional and national market-based emission control programs. Waltzer has a masters of environmental management from Duke University.*

**CAREY BYLIN** *joined the EPA's Climate Change Division as a program manager in August 2005. She manages the division's domestic and international oil and gas work under the Natural Gas STAR Program and the Methane to Markets Partnership's Oil & Gas Subcommittee, where she promotes cost-effective technologies and practices to reduce methane emissions. Prior to joining EPA, Bylin worked for Cummins Inc., leading the development and commercialization of a catalytic emission reduction device for on-road diesel engines. She also has worked for the World Resources Institute. Bylin has an M.B.A. and an M.S. in environmental science from the University of Michigan in Ann Arbor.*

**ROGER FERNANDEZ** *is the team leader for the Natural Gas STAR Program. Prior to joining Gas STAR, as a Mike Mansfield Fellow, Fernandez worked at the Japanese Ministry of Environment and the Japanese Ministry of Economy, Trade and Industry in Tokyo from 2000 to 2002. From 1996 to 2000, he worked with the coal industry on the U.S. EPA Coalbed Methane Outreach Program. Fernandez graduated from Michigan State University in 1992.*

EPA also provides support by marketing Gas STAR and recognizes partners for their commitment to the program through advertisements, press releases, articles and awards.

**Gas STAR Partner's Role**

To join the partnership, a company must merely review and sign a one-page memorandum of understanding, agreeing to evaluate Gas STAR recommended technologies and practices. Based on its goals and resources, the partner participates in the program through many means such as acting on cost effective methane emission reduction opportunities, attending workshops, and reporting successes to the program.

Submitting an annual progress report documenting methane-emission reductions achieved the previous year is a key requirement for Gas STAR partners. Gas STAR annual reports also are beneficial to the company. They provide permanent records of a partner's contributions to reducing greenhouse gas emissions and help to demonstrate to management the financial benefits of reducing methane emissions through additional gas sales, increased operational efficiencies, and safer work environments.

As noted earlier, methane emissions in the U.S. production sector alone account for more than 150 Bcf a year, yet cost effective methane emission-reduction technologies and practices exist. Applying these technologies can substantially increase revenues while simultaneously reducing greenhouse gas emissions. The Natural Gas STAR Program is an excellent resource for oil and gas companies considering new and innovative ways to reduce lost methane and increase profitability.

More detailed information on Natural Gas STAR can be found at http://www.epa-.gov/gasstar/index.htm. ❐